



**APPLYING THE RIGHT FIX
AT THE RIGHT TIME
IN THE RIGHT PLACE**



**2003 ANNUAL REPORT
TRANSPORTATION ASSET
MANAGEMENT COUNCIL**

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PREFACE

"The department and each local road agency shall keep accurate and uniform records on all road and bridge work performed and funds expended for the purposes of this section, according to the procedures developed by the council. Each local road agency and the department shall annually report to the council the mileage and condition of the road and bridge system under their jurisdiction and the receipts and disbursements of road and street funds in the manner prescribed by the council, which shall be consistent with any current accounting procedures. An annual report shall be prepared by the staff assigned to the council regarding the results of activities conducted during the preceding year and the expenditure of funds related to the processes and activities identified by the council. The report shall also include an overview of the activities identified for the succeeding year. The council shall submit this report to the state transportation commission, the legislature, and the transportation committees of the house and senate by May 2 of each year." MCL 247.659a(9)

The Transportation Asset Management Council was appointed by the State Transportation Commission on September 26, 2002. It is the intent of the Council to analyze and report to the Legislature and State Transportation Commission on the current condition of the federal-aid eligible roads and bridges and the investments made to this system. In this way, you will be kept up-to-date on the overall condition of our roads and bridges; how we as road agencies are spending the public dollars you have entrusted to us; and the system needs for maintaining and preserving our roads and bridges.

WITH GREAT APPRECIATION

The Transportation Asset Management Council extends its heartfelt thanks and appreciation to the hundreds of individuals who helped make this year a success. Our grateful thanks are extended to the men and women of the many county road commission, city, and state staffs that gave of their time and expertise in the rating of Michigan's roads. These are the men and women who provide our citizens with countless hours of dedicated service in keeping Michigan on the move. Also, we extend our appreciation to the staffs of the Metropolitan Planning Organizations and Regional Planning Agencies whom coordinated these efforts, set up meetings, and provided the Council with an on-going "presence in the field." Finally, our thanks go to the Council staff for their service and dedication throughout the year. Your willingness to provide us with the information we need in a timely manner has been invaluable. Thank you to all. It is to you that this first major assessment of the condition of Michigan's roads in 20 years is dedicated.

This report was approved by the Transportation Asset Management Council on April 7, 2004.

EXECUTIVE SUMMARY

Act 499 of 2002 changed the way we look at the condition of our roads and bridges in Michigan. Rather than periodic “needs studies” the Legislature adopted an on-going asset management process. This was the central recommendation of the Act 51 Transportation Funding Study Committee’s report to the Legislature in June 2000.

Why asset management? What makes it different from other processes? First of all, it is a strategic approach rather than tactical; that is, it considers the entire network, rather than individual projects. Asset management is proactive rather than reactive. It seeks to manage the condition of a pavement before it needs to be totally reconstructed. Asset management brings together the disciplines of engineering, planning and budgeting; disciplines that have often remained in their own silos in the past. It focuses on the function of the road rather than on ownership of the road.

Asset management allows agencies to prepare for the future by using the power of modern technology to consider a wide range of scenarios and “what if” possibilities. It allows them to answer such questions as:

- What is the impact on the construction program if there is a 10% cut in funding?
- What will the system look like in 10 years if we continue on the same path as today?
- What condition will the system be in with an additional \$1 million per year for capital preventive maintenance?

One of the most critical concerns raised during the Act 51 Transportation Funding Study Committee’s deliberations was the fact that there were a myriad of numbers being used to describe the condition of the roads. These different measures often seemed contradictory when compared to one another. The Committee stressed the need for policy makers to have one method and one method only that they could rely on. They also recommended the establishment of a body to oversee a statewide asset management process. In 2002, the Legislature created the Transportation Asset Management Council

Given the task of developing a statewide asset management process and using a single rating system, the Transportation Asset Management Council decided to use the Pavement Surface Evaluation and Rating System – PASER for short -- as the method of rating the condition of Michigan’s federal-aid eligible public roads. PASER is a visual survey that measures the surface distress on a 1-10 scale.

The Council does not report the individual ratings of a segment of road. The Council groups the ratings into three “work improvement” categories. These categories are “routine maintenance” (ratings 8, 9, 10); “capital preventive maintenance” (ratings 5, 6, 7); and “structural improvement” (ratings 1, 2, 3, and 4). These categories represent broad areas of work that might be undertaken to maintain, preserve, or improve the overall condition of the network.

During 2003, the Council rated 93,908 lane miles of federal-aid eligible public roads. Statewide there were nearly 34,170 lane miles needing routine maintenance; 49,653 lane miles needing capital preventive maintenance; and 10,085 lane miles needing structural improvement. Seven percent of the arterial system needs structural improvements while nearly 14% of the collector system needs structural work. Only 9% of the bridges on the arterial system and 6% on the collector system, are currently rated

as structurally deficient. Seventy-two percent of the bridges on the federal-aid eligible system are rated as good.

While this data provides useful information now, Michigan's efforts to establish an asset management-based process will take several years to complete. In order to develop appropriate deterioration curves, which are critical to forecasting future condition, a minimum of three years of condition data are necessary. The Council has just completed the first year of collecting statewide condition data. Also, at this time, the Council does not have sufficient information to determine what it would cost to fix these roads and bridges. During the coming year, the Council will be working with local and state road and bridge engineers to develop unit costs, determine appropriate mix of fixes and establishing deterioration rates.

The Council had a productive and successful year during 2003. The following is a list of their major accomplishments:

- Approved a work program for 2003 and submitted it to the State Transportation Commission.
- Published the First Annual Report as required by MCL 247.659a.
- Conducted a statewide survey of road agencies to determine the extent of agencies using a pavement management process.
- Assessed the condition of nearly 94,000 lane miles of federal-aid eligible roads.
- Conducted 10 training sessions with over 200 participants.
- Adopted a list of 6 priorities and began the process of developing a work program for 2004-06.
- Held Council meetings in Bay City, Bellaire, Escanaba, Gaylord, Grand Rapids, Lansing, and Waterford Township.
- Selected the Center for Geographic Information to serve as the data agency required by MCL 247.659a.
- Set up a cooperative partnership with Metropolitan Planning Organizations and Regional Planning Agencies to provide technical assistance to the Council as required by MCL 247.659a.
- Members participated in numerous meetings on asset management including:
 - Transportation Summit
 - 5th National Conference on Asset Management
 - SEMCOG University on Asset Management
 - County Road Association Annual Conference
 - Michigan Municipal League Summer Conference
 - Michigan Chapter of APWA Annual Conference

INTRODUCTION

This report is being submitted to the Michigan Legislature and the State Transportation Commission in accordance with the provisions of MCL 247.659a. The purpose of the report is to inform both bodies of the current condition of Michigan's federal-aid eligible public roads and bridges and the recent activities of the Transportation Asset Management Council.

From Needs Studies to Asset Management

Act 499 of 2002 amended Section 9a of MCL 247.659. This section, since 1972, required the development of a "needs study" on a four-year basis. Act 499 eliminated the requirement of a regular needs study and replaced it with an asset management process.

Needs studies had several key objectives. First, they provided elected officials and the public, in a single volume, an inventory of the highway system and the revenues needed to retire the identified deficiencies. Second they served as a backdrop to establish revenue increases and to determine the distribution of funds amongst transportation providers.

Michigan conducted several needs studies during the 1970s but the most extensive one was done in 1983. The 1983 study included all modes and covered the period of 1983 through 1994.

There were many problems with the needs study process in Michigan and consequently the 1983 study was the last one done in the state. First, the funds needed to retire the deficiencies appeared to be staggering. Highway and bridge needs alone were in excess of \$22 billion. Capital outlay needs were \$13 billion. Second, it was assumed that all needs were of equal importance. Repaving a two-lane rural road carrying 200 vehicles a day was considered to be of same importance as repaving a freeway. There simply was no prioritization of the needs. The Legislature had no idea which needs were of more importance to the economy and welfare of the state. Consequently, it was impossible to use the information for any type of long-range planning. Third, there were no standards identified, nor performance measures to determine whether or not the goal of achieving improved mobility had been achieved. And there was no monitoring mechanism in place to ensure the dollars were being spent on the needs. Finally, the law did not define "needs" and seemed to imply that there was a direct correlation between the needs and the distribution of transportation funds. The fact of the matter is that in the entire history of needs studies in Michigan there has been no correlation between the identified needs and the distribution of road funds. The needs studies were never used to make decisions about changing the allocation of funding.

In 1998, the Legislature passed Public Act 308 which created the Act 51 Transportation Funding Study Committee. This committee was called upon to study transportation funding issues, to weigh information from affected agencies and interest groups, and make recommendations for the future. After meeting for about 14 months, the committee issued its final report, ***Transportation Funding for the 21st Century***. The major recommendation coming from the committee was that a long-range asset management process be established to manage Michigan's transportation infrastructure.

During the session of 2001-2002, the Legislature acted upon the committee's recommendations and created the Transportation Asset Management Council. Their

mission, according to the law is to advise the State Transportation Commission on a statewide asset management strategy and the necessary procedures and tools to implement that strategy. The Council has been meeting monthly since October 2002.

The major philosophical change that has taken place with the passage of this law is to look at the road system holistically rather than as individual projects.

ELEMENTS OF ASSET MANAGEMENT

The major elements of an asset management system are:

- Establishing goals and objectives through development of a strategic plan,
- Collecting data to measure progress toward achieving the established goals and objectives,
- Using management systems to control the various processes,
- Developing appropriate performance measures,
- Identifying standards and benchmarks,
- Developing alternative analyses procedures,
- Making decisions based on these results and developing an appropriate program,
- Implementing the program,
- Monitoring and reporting results of actions taken.

Traditionally, public sector management of roads and bridges has been tactical in nature, concentrating on the immediate and most severe problems. Asset management shifts that thinking to one that is strategic in nature. Decisions are made with regard to the long-range condition of the entire system. This requires considering various investment strategies which will maintain the assets in good condition.

It is crucial in an asset management process to have the ability to forecast future road and bridge conditions and to do investment analyses based on various funding scenarios. The strategic component of the decision-making process entails the ability to assess improvements based on desired outcomes. The strategic focus of an asset management process is supported by network level analysis in addition to the tactical focus of performing location-specific, project-level analysis. This task would include consideration of:

- Current condition of the transportation system and future condition if there is no change in current practices;
- Future condition based on alternative strategies;
- The right time to maintain, preserve, or improve to get maximum useful life from a transportation asset;
- Use preventive fixes or allow an asset to deteriorate to the point of requiring reconstruction;
- Costs and benefits of each decision; and
- Relationship to identified goals and objectives.

The key is the conscious effort required to create and analyze alternatives. It is necessary to focus attention on effectively and efficiently managing and operating our transportation system, rather than merely reconstructing it.

Elements Of Pavement Management

Once a road has been constructed or reconstructed, the condition of the pavement will begin to change over time, due to the effects of weather, environmental factors and traffic loads. Weather factors include the amount of rain/snow, temperatures (particularly extreme heat and cold), humidity, freeze-thaw cycles, exposure to sunlight, etc. Environmental factors include soil types. Traffic load includes some function of traffic frequency and the weight of the vehicles.

There are also combined effects between these two main factors. Heavy and frequent traffic loadings while the pavement is more vulnerable due to severe weather will cause more damage than the same loadings during favorable weather. In addition, several other factors can contribute to the rate at which pavement deteriorates. These include:

- Type, condition, and moisture content of the sub grade soil,
- Type, thickness, and strength of the base materials,
- Timing of preventive maintenance fixes, and
- Quality of construction.

According to the American Association of State Highway and Transportation Officials (AASHTO): “Those who work with pavements know that after a pavement is built, traffic and environmental loadings create unavoidable stress that will eventually reduce the condition of the roads to a point where they will not be usable without maintenance. They also know that early treatment will extend the life of some pavement.”¹

Preventive maintenance programs are designed to extend the life of good pavements by applying low cost, short term treatments. Preventive maintenance projects are low cost projects intended to protect an existing pavement structure, slow the rate of pavement deterioration, and/or correct overall deficiencies in the pavement surface. The benefit of preventive maintenance activity can best be realized if an agency applies treatments to a pavement in good condition. Preventive maintenance treatments cannot be targeted to the worst roads, but must be made to those in fair or good condition which have defects that if left unattended would require much more costly repairs.

The challenge for most agencies is to determine when in the life of a pavement is the best time to apply a preventive maintenance treatment for the maximum benefit. Preventive maintenance is perhaps the single most influential component in the network strategy, that allows an agency to manage pavement conditions. It creates the ability to postpone costly reconstruction or rehabilitation activities, by extending the remaining service life of the original pavement.

A significant benefit of a comprehensive preventive maintenance program is that it gives managers control over future network conditions and funding requirements. By controlling future network conditions, decision makers can anticipate routine maintenance work loads, safety deficiencies, and ride quality needs. Several studies have found that a dollar invested in preventive maintenance will save from \$4 to \$6 in future reconstruction or rehabilitation costs.

¹ “Executive Summary Report: Pavement Management Guide,” AASHTO, November 2001, pp. 1-2.

PAVEMENT DETERIORATION

"The rate at which pavement deteriorates depends on its environmental, traffic loading conditions, original construction quality, and interim maintenance procedures. Poor quality materials or poor construction procedures can significantly reduce the life of a pavement. Therefore, two pavements constructed at the same time may have significantly different lives, or certain portions of a pavement may deteriorate more rapidly than others, due to material or construction problems. On the other hand, timely and effective maintenance can extend the life of a pavement. Crack sealing and seal coating can reduce the effect of moisture in aging of asphalt pavement. With all these variables, it is easy to see why pavements deteriorate at various rates and why we find pavements in various stages of repair ... Once significant deterioration begins it is common to see pavements deteriorate rapidly. This is usually due to a combination of loading and the effects of additional moisture. As a pavement ages and additional cracking develops, more moisture can enter the pavement and accelerate the rate of deterioration."

Asphalt - PASER Manual, Transportation Information Center, University of Wisconsin-Madison, 1996, pp. 4, 16.

Pavement Analysis & Overview of PASER

The American Association of State Highway and Transportation Officials (AASHTO) identifies four methods of determining pavement condition.²

Surface Distress is damage to the pavement surface. Distress surveys are performed to determine the type, severity, and quantity of observable surface distress.

Structural Capacity deals with the maximum load and the number of repetitions a pavement is predicted to carry. Structural analysis is normally conducted to determine the current pavement load-carrying capacity which can be compared to the capacity needed to accommodate projected traffic.

Roughness (ride quality) is a measure of pavement surface distortion or an estimate of the ability of the pavement to provide a comfortable ride to the users.

Surface Friction or Skid Resistance is the ability of the pavement surface to provide sufficient friction to avoid skid-related safety problems, especially in wet weather.

One of the most critical concerns raised during the Act 51 Transportation Funding Study Committee's deliberations was that there were a myriad of numbers being used to describe the condition of our roads. The reason for the different numbers is related to which of the above methods is being used to determine pavement condition. For instance, the International Roughness Index (IRI) measures roughness. This is what is reported in the TRIP report each year. There is remaining surface life which is used by several agencies including MDOT. There is a pavement condition index or PCI. Both remaining surface life and PCI combine elements of surface distress and structural capacity. And there is PASER, a surface condition analysis used by most of the road agencies throughout Michigan. And while the tendency is to compare these different methods, the truth is they do not measure the same conditions and should not be compared. The Act 51 Transportation Funding Study Committee stressed the need for policy makers to have one method and one method only.

² "Executive Summary Report: Pavement Management Guide," AASHTO, November 2001, p. 7.

The Council chose the **Pavement Surface Evaluation and Rating System** (PASER) because it is easy to collect; is of sufficient detail for statewide, network-level analysis; and is the method currently used by most road agencies in Michigan. PASER is a visual survey. It rates the condition of various types of pavement distress on a scale of 1-10. It is based on a system of pavement evaluation developed in Wisconsin and is used by most road agencies in that state.

The Transportation Information Center, University of Wisconsin-Madison has published a series of manuals associated with ratings for different types of surfaces. The manuals are “designed to provide background information on asphalt pavement conditions and causes of distress as well as a simple procedure to rate pavement condition.”³ There are also manuals for concrete, gravel, brick, etc.

PASER is the rating method used by RoadSoft, which is the predominant pavement management software in use throughout Michigan. The Council chose to rate Michigan’s roads using the PASER rating method, for the first three years. After that time, a different rating method could be considered.

As mentioned, PASER is a visual, windshield survey. This type of survey is one of the easiest to do and is relatively inexpensive compared to other rating methods. This makes it ideal for small agencies.

While PASER is a subjective method it is based on sound engineering principles. PASER measures “surface distress.” It does not measure structural capacity, ride quality or friction.

PASER uses 10 separate ratings. There are different ratings for different surfaces based on the types of deterioration that is evident. The Appendix contains photos from the various PASER manuals for all ratings for asphalt, concrete, and gravel surfaces. For the Council’s purposes these ratings have been grouped into three work-related improvement categories.

Routine Maintenance

Routine maintenance is the day-to-day regularly-scheduled activities to prevent water from seeping into the surface such as street sweeping, drainage clearing, gravel shoulder grading, repairing potholes, and sealing cracks. PASER ratings 8, 9, 10 are included in this category. The following pictures show the types of roads that require routine maintenance. This category includes roads that are newly constructed or recently seal coated. They require little or no maintenance. All cracks are sealed tightly.

³ **Asphalt – PASER Manual**, Transportation Information Center, University of Wisconsin-Madison, November 1996



Capital Preventive Maintenance

Capital preventive maintenance (CPM) is at the heart of asset management. It is the planned set of cost effective treatments to an existing roadway that retards further deterioration and maintains or improves the functional condition of the system without significantly increasing the structural capacity. The purpose of capital preventive maintenance fixes is to protect the pavement structure, slow the rate of deterioration, and/or correct pavement surface deficiencies. Studies have shown that if you invest a dollar today in a CPM fix you can save anywhere from \$4 to \$6 later in more expensive structural improvements.

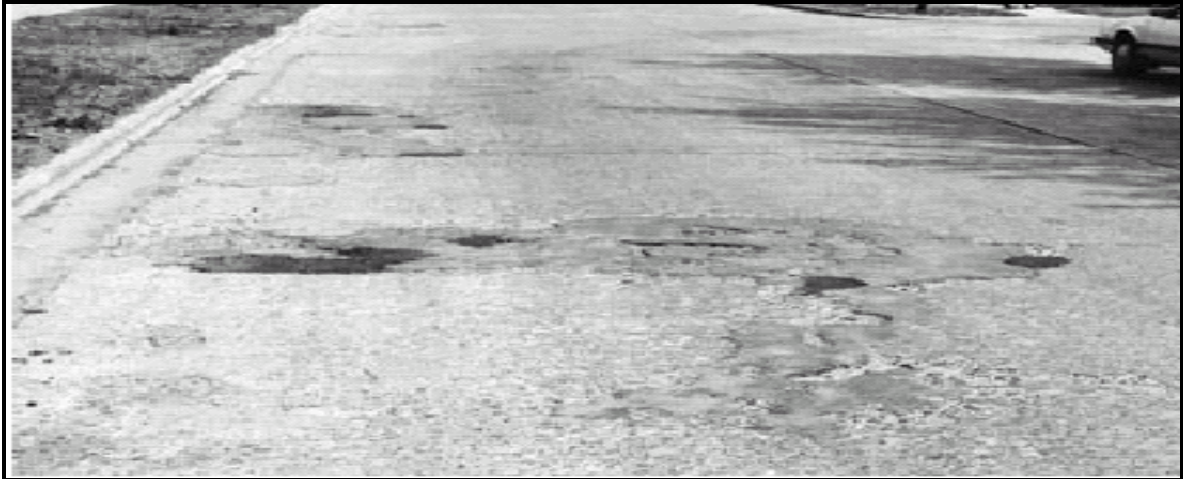
CPM is intended to address pavement problems before the structural integrity of the pavement has been severely impacted. PASER ratings 5, 6, and 7 are included in this category. Typical fixes in this category, include micro-surfacing, chip seals, joint resealing, diamond grinding, crack repairs, minor patching, and seal coating.

In the following pictures we are beginning to see the first signs of wear. The roads still show good structural support but the surface is starting to deteriorate requiring more extensive crack filling or seal coating. Longitudinal cracks or moderate flushing may be occurring. Transverse cracks and block cracking are becoming evident. There may be the start of some spalling along joint edges.



Structural Improvement

Roads with a PASER rating of 1, 2, 3, or 4 are in need of some type of structural improvement such as resurfacing or major reconstruction. Rutting is beginning to take place. Large patches are required. Alligator cracking is evident. Joints and cracks are badly spalled. There are broken slabs requiring complete rebuilding. The following pictures show roads with these types of problems.



For a more extensive view of the types of distresses associated with each PASER rating see the Appendix.

ASSESSMENT OF THE FEDERAL-AID ELIGIBLE SYSTEM

MCL 247.659a directs the Council to focus its efforts on the federal-aid eligible system first and then once completed, continuing on with local roads and streets.

Certified Miles

There are 617 agencies that are funded through the Michigan Transportation Fund. These agencies had jurisdiction over some 120,440 route miles (centerline miles). Since 1965, the system has grown by over 7,200 miles of which 61% is in city-owned streets. (See following table.) This is logical when one considers the urbanization growth during the 70s and 80s. However, if you look at the last 5 years a very different picture emerges. Since 1998, just over 800 miles have been added, an average of 160 new miles a year. Two-thirds of this growth (66%) has been on the county-owned system. This reflects the growth of residential and commercial activity that has taken place in townships located on the edges of urban areas. [Note: The negative figure for state-owned roads is due to the transfer of miles to local jurisdictions as new roads were opened like US-127.]

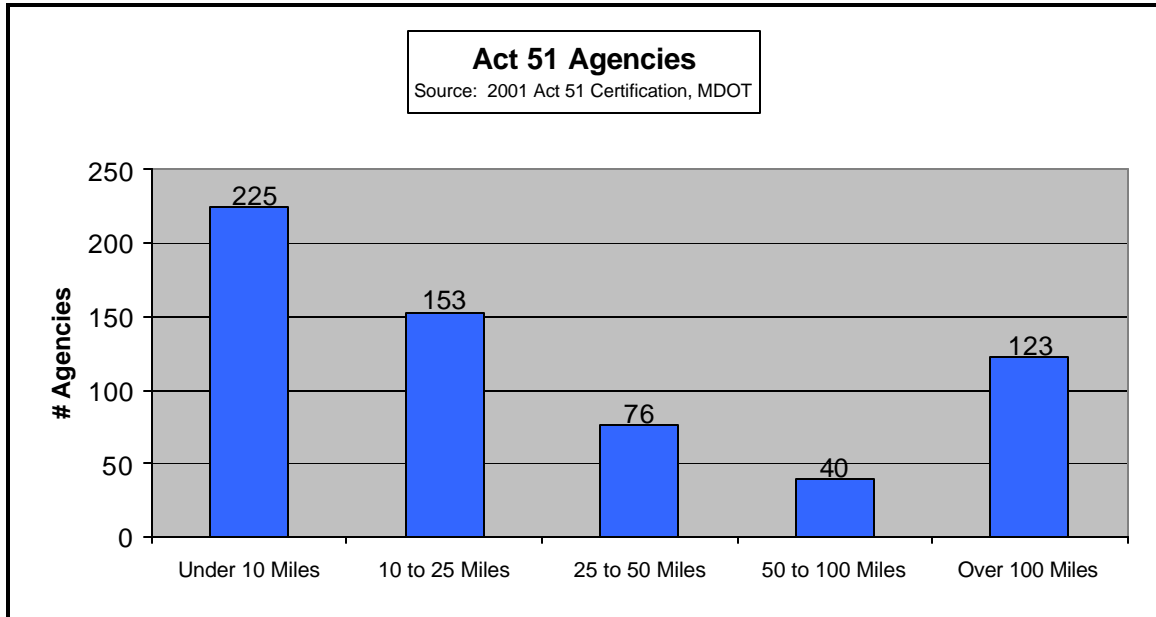
SYSTEM GROWTH

	1965		2003		Change in Miles	Percent of Miles Changed
	Miles	Percent	Miles	Percent		
State Trunkline	9,239.00	8%	9,722.00	8%	483	7%
County Total	87,465.00	77%	89,877.00	75%	2,412.00	33%
City Total	16,523.00	15%	20,841.00	17%	4,318.00	61%
Grand Totals	113,227.00	100%	120,440.00	100%	7,213.00	100%

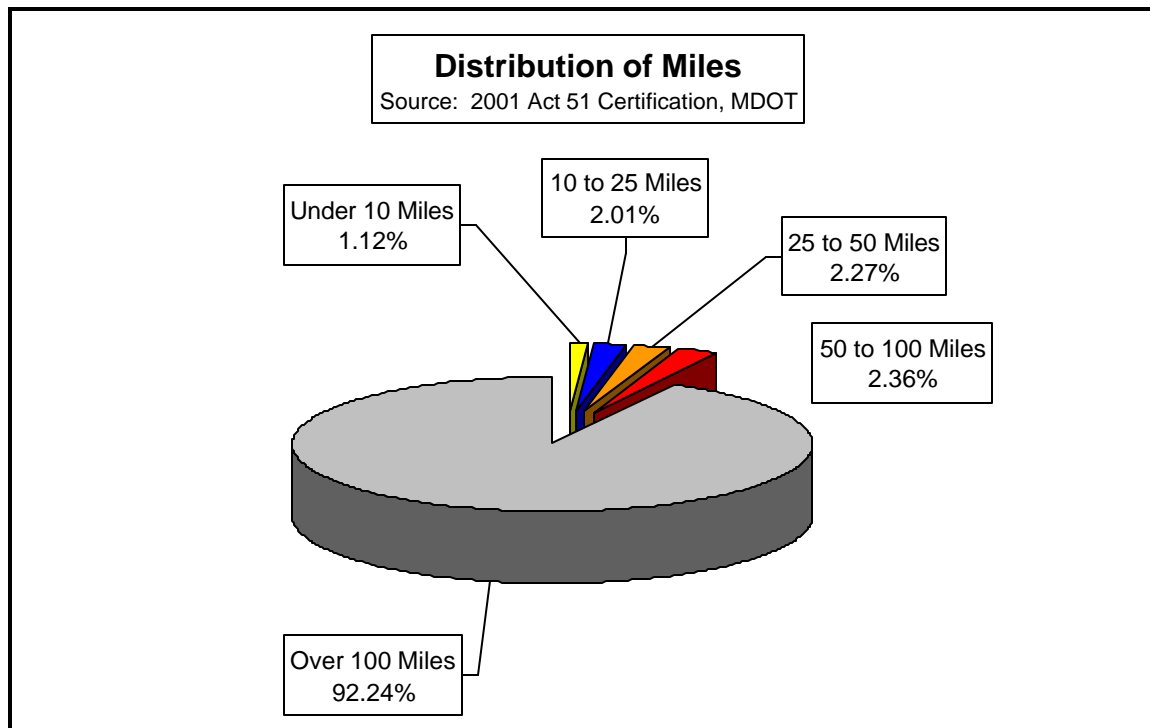
	1998		2003		Change in Miles	Percent of Miles Changed
	Miles	Percent	Miles	Percent		
State Trunkline	9,725	8%	9,722.00	8%	-3	0%
County Total	89,344	75%	89,877.00	75%	533	66%
City Total	20,570	17%	20,841.00	17%	271	34%
Grand Totals	119,639	100%	120,440.00	100%	801	100%

Sources: 1965 data – "Highway Classification in Michigan," Dept. of State Highways, 1967, p. 19. 2003 data: Official Certification, Asset Management Section, Bureau of Transportation Planning.

The distribution of mileage among the 617 agencies is quite disparate. There are agencies with jurisdiction over as little as a mile or less to MDOT with jurisdiction over 9,700 miles. The following graph shows the distribution of agencies by system size. The data comes from the Michigan Department of Transportation's Act 51 certification for 2001.



The vast majority of the highway assets – 92% of all route miles – are managed by the 123 agencies with jurisdiction over 100 miles of road. These 123 agencies represent 20% of all agencies, whereas 80% of the agencies own only 8% of the assets.



Data Collection Effort

Transportation asset management is a data intensive process. The ultimate goal of any asset management process is to provide the data and tools for decision-making in both the short-term and the long-term. For any asset management system to work effectively, appropriate data must be collected, stored, and analyzed.

Data collection for 2003 was coordinated through the 20 regional planning agencies and metropolitan planning organizations. Each of the planning agencies and MPOs were responsible for initiating and maintaining contacts for training and scheduling with the road agencies in their respective areas.

MDOT staff, experienced in data gathering, conducted 10 training sessions around the state. Over 200 individuals attended. The training consisted of a review of the various PASER ratings, overview of how to use the RoadSoft laptop data collector, and a discussion of “rules of thumb” to use while in the field.

Teams of county, state, city and regional staff worked in cooperation. This was a critical component of the data collection effort. Follow-up reports to the Council indicated that the increased cooperation was one of the positive outcomes about the process.



Up to 11 teams worked from the last part of July until just before Thanksgiving. They drove nearly 54,500 miles and rated 43,066 miles of road. This effort required 2,060 crew hours. In addition to the PASER rating, crews collected information on the type of surface (asphalt, concrete, etc.) and the number of lanes. Vehicles were equipped with a global positioning satellite (GPS) receiver which allowed for accurate locating of information and tactical use of the data by local agencies.

Quality Control

Our primary means of quality control was to have PASER ratings collected twice, by two different crews, on the state trunkline. We collected the information both through the Council's data collection process and MDOT's Sufficiency process. Because PASER is a subjective, visual assessment, we wanted to test how closely two groups of raters would be, on the same stretch of road, working totally independently of each other. The raters working on behalf of the Council were not aware of the other group. We reviewed the ratings of both groups and determined the percentage of times that the ratings were within one or two rating points of each other. Statewide, the results were satisfactory with an average of 93% of the miles rated being within one or two points of each other. It is also important to point out that the Council has just completed the first year of data collection in this process. The Council has established a goal to increase this accuracy.

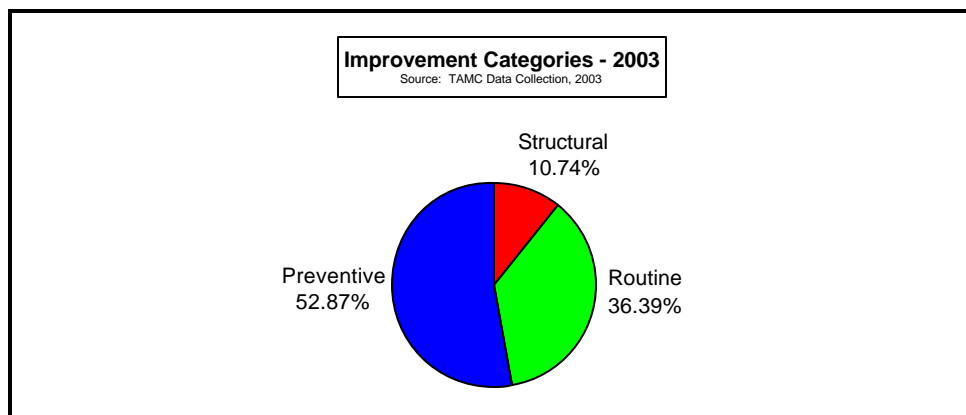
Road and Bridge Condition

During the months of July through November, 11 teams of surveyors drove some 54,500 miles in order to assess the condition of the state's 43,066 miles of federal-aid eligible roads. This was the most extensive effort since the 1983 Needs Study.

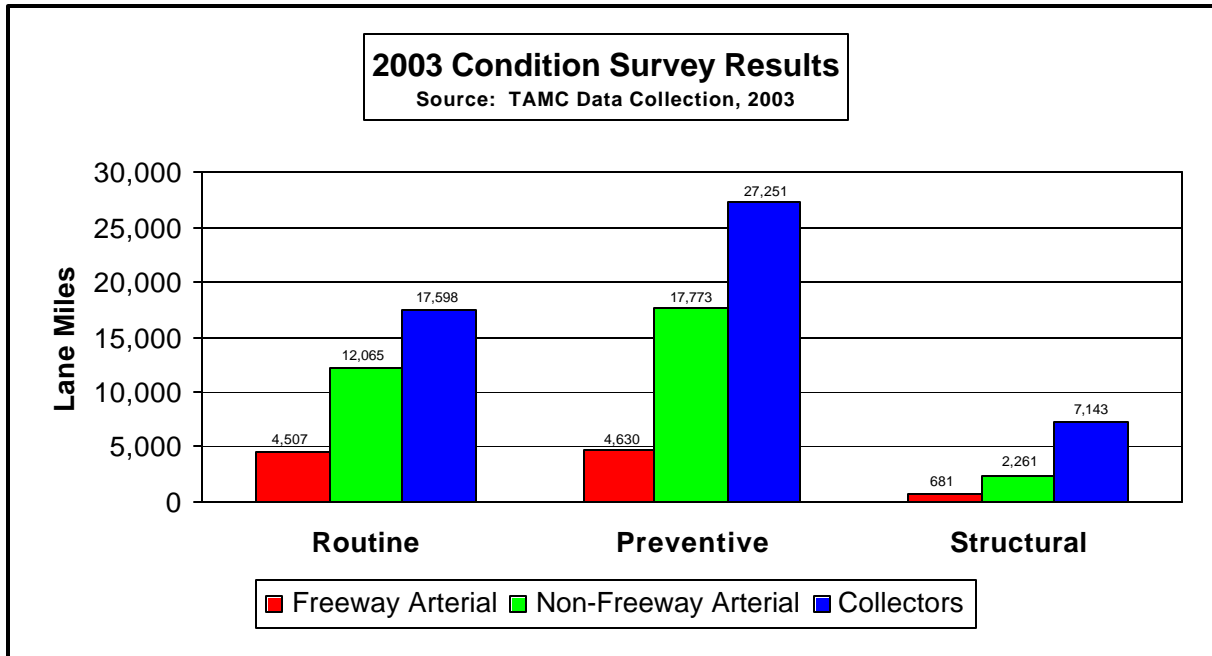
The data is reported in lane miles. A lane mile is determined by multiplying the number of lanes by the length of the road. For example, if you were surveying 5 miles of a 2 lane road you would be rating 10 lane miles. If it were a 4 lane road then you would have 20 lane miles. So while we had 43,066 route miles this translated into over 93,900 lane miles.

The Council does not report the individual ratings of a segment of road. The Council uses the data to report statewide and regional condition totals and that individual ratings of individual segments are reported back to the appropriate jurisdiction for use in the development of local projects. The Council groups the ratings into three "work improvement" categories. These categories are "routine maintenance" (ratings 8, 9, 10), "capital preventive maintenance" (ratings 5, 6, 7), and structural improvement (ratings 1, 2, 3, and 4). These categories represent broad areas of work that might be undertaken in order to maintain, preserve, and improve the overall condition of the network. See the Appendix for tables related to the survey.

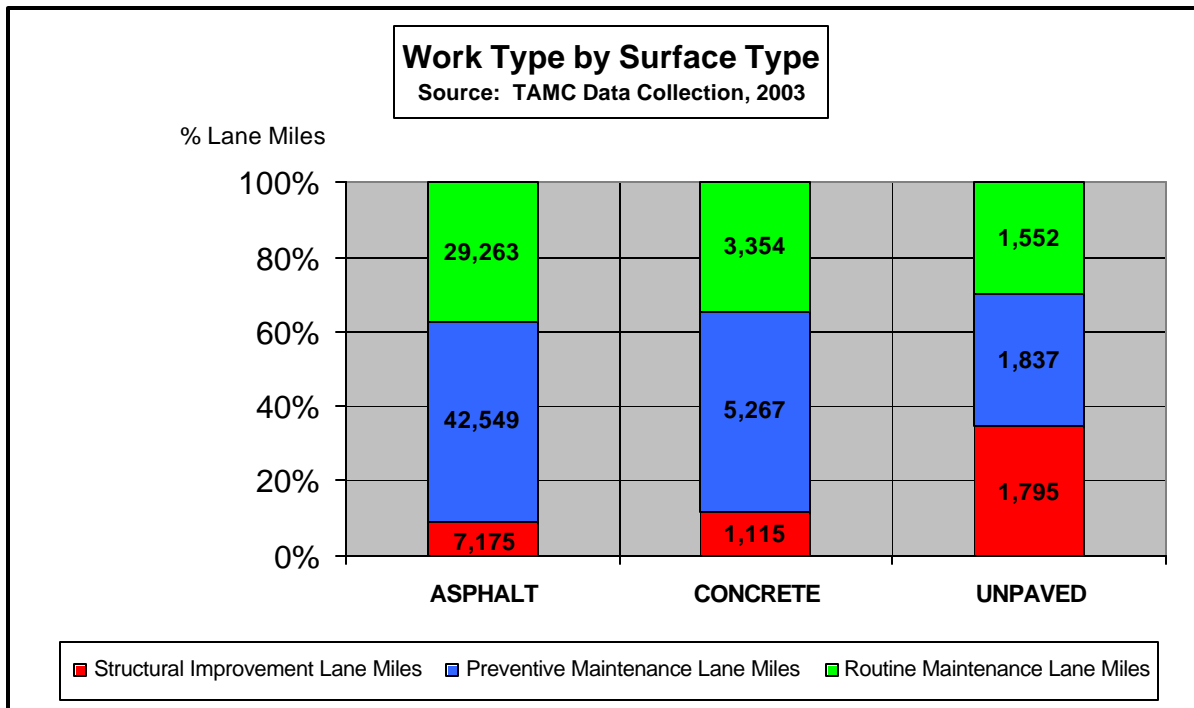
Overall there were nearly 34,170 lane miles needing routine maintenance; 49,653 lane miles needing capital preventive maintenance; and 10,085 lane miles needing structural improvement.



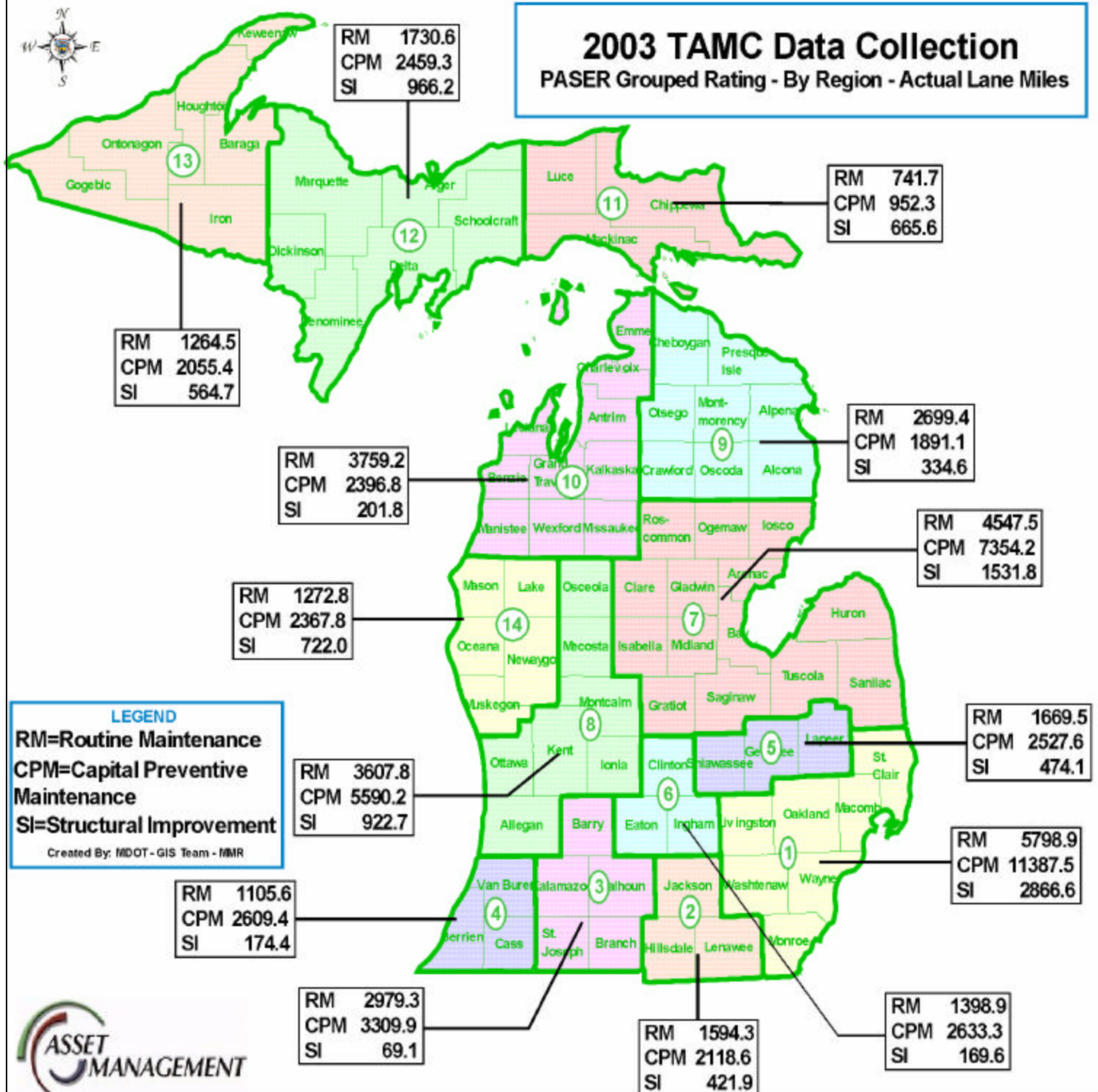
The largest group needing structural improvement was collectors with 7,143 lane miles falling into this category. The smallest group was the freeways with only 386 lane miles needing structural improvement. The following graph shows these breakdowns.



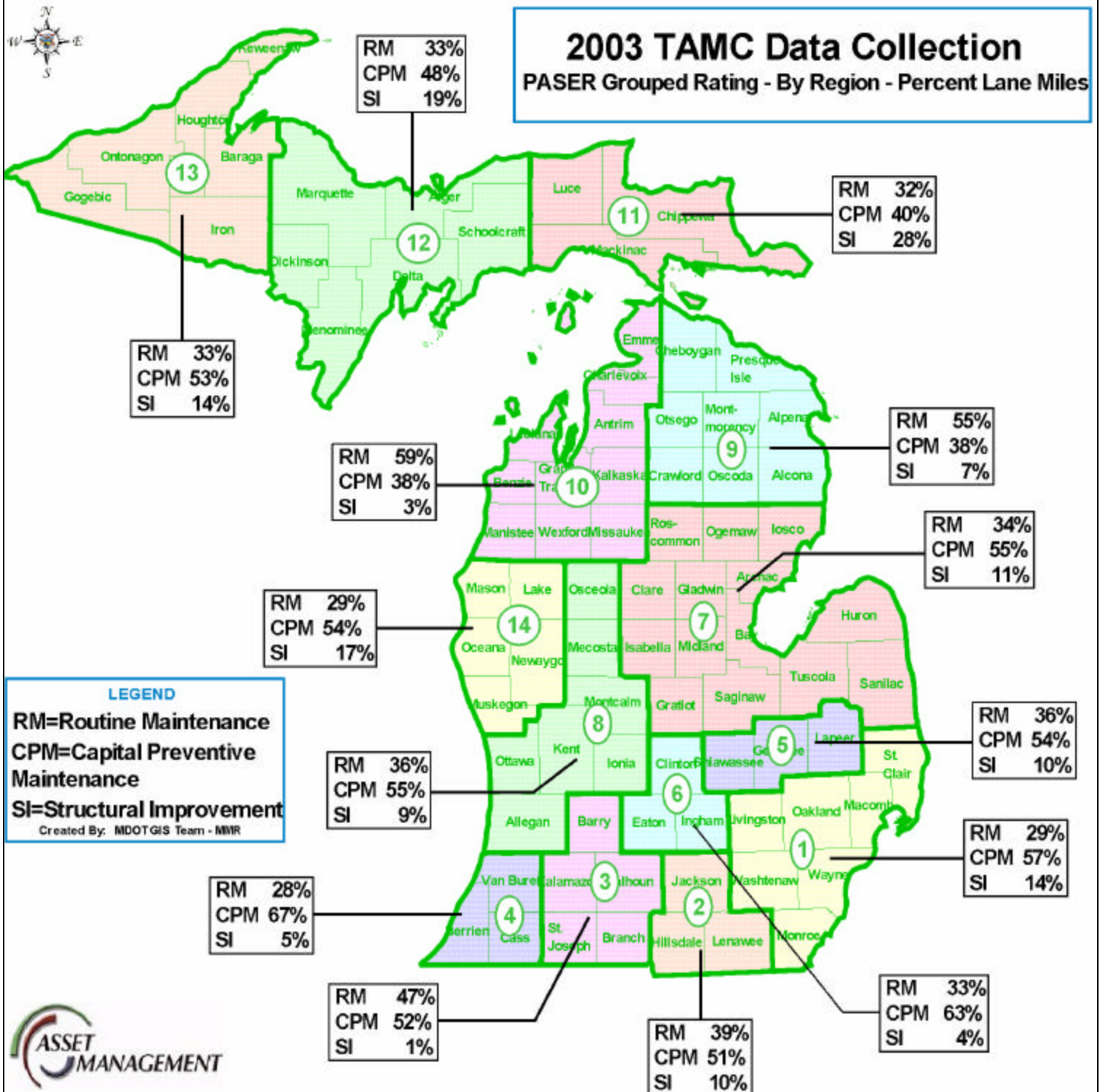
The Council also analyzed the data based on surface type. Nearly 85% of the lane miles on the federal-aid eligible system are asphalt, with concrete making up 10% and unpaved or brick the remaining 5%. The following graph shows the results of the survey by surface type.



Results from 2003 TAMC Data Collection



Results from 2003 TAMC Data Collection



Bridges

Bridges can be classified as “structurally deficient” or “functionally obsolete.” These classifications are determined by the National Bridge Inventory database (NBI). A **structurally deficient** bridge is one in which at least one of the major structural elements (deck, superstructure, or substructure) has a condition rating of poor or worse. A **functionally obsolete** bridge is one that is not structurally deficient, but has deficient roadway width, vertical clearance, waterway, road alignment or load capacity.



Federal law requires that bridges be inspected at least once every two years. There are 9 different categories which determine whether a bridge is classified as “deficient.” Condition ratings are based on a 0-9 scale and assigned for the superstructure, the substructure, and the deck of each bridge. A condition of 4 or less classifies the bridge as being “deficient.”

<u>CATEGORIES</u>	<u>NBI CONDITION RATINGS</u>
Culvert Condition	9=Excellent
Approach Alignment	8=Very Good
Underclearance	7=Good
Deck Geometry	6=Satisfactory
Waterway Adequacy	5=Fair
Structural Evaluation	4=Poor
Substructure Condition	3=Serious
Superstructure Condition	2=Critical
Deck Condition	1="Imminent" Failure
	0=Failure

Structurally Deficient: Generally, a bridge is structurally deficient if any major component is in “poor” condition. If any one or more of the following are true, then the bridge is structurally deficient.

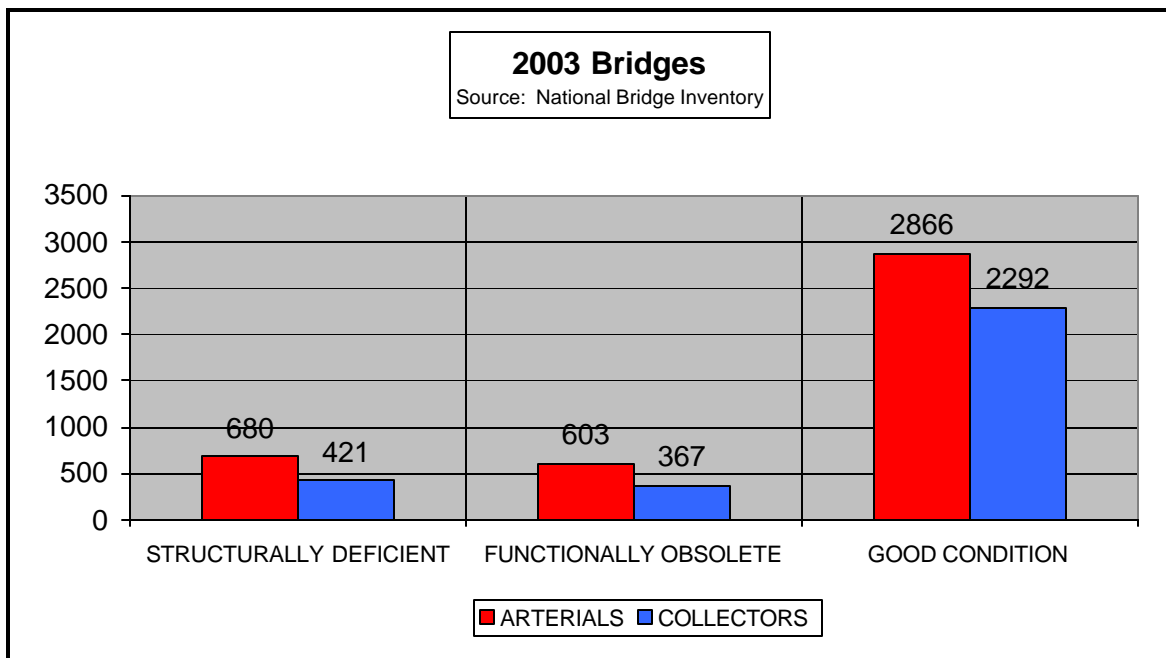
Deck Rating is less than 5
 Superstructure Rating is less than 5
 Substructure Rating is less than 5
 Culvert Rating is less than 5
 Structural Evaluation is less than 3
 Waterway Adequacy is less than 3

Functionally Obsolete: Generally, a bridge is functionally obsolete if it is NOT structurally deficient AND its clearances are significantly below current design standards for the volume of traffic being carried on or under. More specifically, if the bridge is NOT structurally deficient AND any one or more of the following are true, then the bridge is functionally obsolete.

Structural Evaluation = 3
 Deck Geometry is less than 4
 Underclearance is less than 4 and there is another highway under the bridge
 Waterway Adequacy = 3
 Approach Roadway Alignment is less than 4

A bridge cannot be classified as both structurally deficient and functionally obsolete. If a bridge qualifies for both, then it is reported as structurally deficient. While functionally obsolete bridges represent needed improvements if the overall system is to achieve maximum operating efficiency, the bridges rated as structurally deficient require more immediate attention.

Only 9% of the bridges on the arterial system are currently rated as structurally deficient and 6% on the collector system. Forty percent of the bridges on the arterial system are in good condition and 32% of those on the collector system are rated good. The remaining bridges are considered functionally obsolete. The following graph shows the condition of the state's bridges for 2003.



INVESTMENTS IN THE SYSTEM

MCL 247.659a(9) requires the Council to report on the "receipts and disbursements of road and street funds". The language mirrors that in MCL 247.664. This section of Act 51 of the Public Acts of 1951, as amended, requires local road agencies to report to the department on how they spent their road funds during the previous fiscal year. The use of the same language in MCL 247.659a(9) was deliberate. It was intended that the Council would be able to use the annual financial reports for the Council's reporting requirements, thus easing the reporting burden on local agencies.

However, in reviewing recent Act 51 reports and the forms agencies use to file the required information, it was discovered that the data currently being reported does not allow expenditures to be categorized into various improvement groups. Further, the data reported by city and county agencies is reported differently from the way MDOT reports its expenditures.

The Council needs information related to investments made in the preservation and improvement of pavements and bridges. They also need accurate information on routine maintenance. Currently, these expenditures are often included in other categories and cannot be deciphered independently. Further, the Council needs the information in such a manner as to be able to determine total expenditures for routine maintenance, capital preventive maintenance, and structural improvements. This cannot be done with the existing reporting forms. Also, significant levels of investments can be made in the system through other funding sources such as when a city undertakes a sewer rehabilitation project and pays for the reconstruction of the road with sewer bonds or special assessments.

During 2004, the Council will be working with the department and local road agencies to more accurately define the data so that it can be used to report to the Legislature and State Transportation Commission on actual investments by program categories. The data, as reported now, is sufficient and accurate for accounting purposes but not for analyzing the type nor location of investments in the system.

COUNCIL ACTIVITIES

MCL 247.659a(9) requires the Council to report on “the results of activities conducted during the preceding year and the expenditure of funds related to the processes and activities identified by the council. The report shall also include an overview of the activities identified for the succeeding year.” This chapter contains the required information.

The Council held 11 regular monthly meetings during 2003. There was no meeting held during the month of July. In addition to meeting in Lansing, the Council also met around the state, usually at county road commission offices. This allowed local road agencies and department field staff to see firsthand the Council in action. This was a key part of the Council's priority to develop and maintain a spirit of cooperation amongst road agencies.

The Council has organized into three working committees. They are the Administrative and Education Committee; the Data Management Committee; and the Strategic Analysis Committee. These committee's meet on a monthly basis and each is responsible for ensuring specific work items within the Council's Work Program remain on schedule and are completed on time.

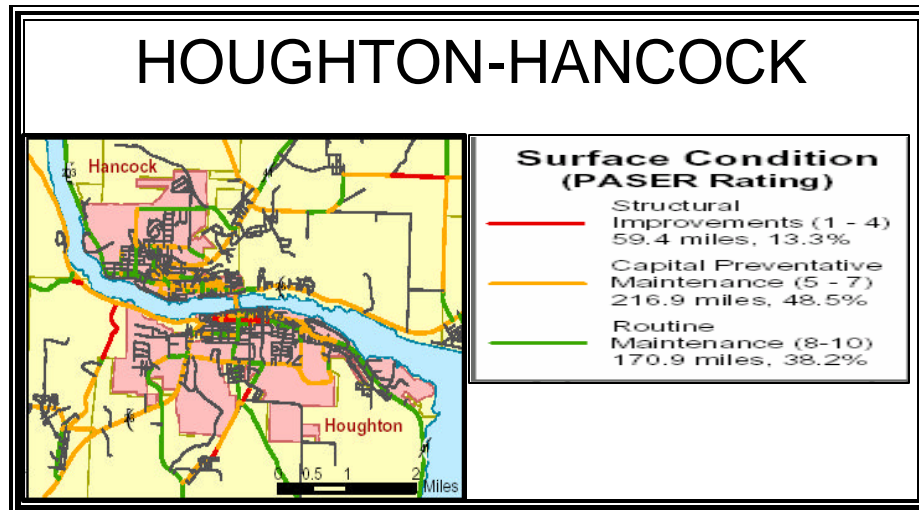
During the year the Council also took several actions that were critical to fulfilling its statutory obligations. These actions included setting up a process whereby the state planning and development regions could provide technical assistance to the Council as required by MCL 247.659a(4) and selecting the central data storage agency as required by MCL 247.659a(1)(c) and (2).

State Planning and Development Region Involvement

During 2003 contracts were established with the 20 regional planning agencies and metropolitan planning organizations. Under the contract these agencies assisted the Council in its data gathering and training functions. Specifically, they:

- Coordinated the road condition assessment with the city and county road agencies within their respective areas,
- Participated as members of the rating teams,
- Upon completion of the effort made the data available for public review, and
- Provided the Council with a 3-year list of projects on the federal-aid system, for inclusion in the multi-year program.

Overall, these agencies have done an excellent job on behalf of the Council. Below is an example of what one agency has done to make the data available for public review. Additional information from the Western Upper Peninsula Planning and Regional Development agency can be seen in the Appendix.



Central Data Agency

Once data are collected they need to be stored. MCL 247.659a(1)(c) and (2) requires that a “central storage data agency” be chosen by the Council for the purpose of storing and maintaining the data collected by the Council. In the fall of 2003, the Council chose the Center for Geographic Information (CGI) of the Michigan Department of Information Technology to serve as the central data agency. This selection was submitted to the State Transportation Commission and approved by them at their November 20, 2003 meeting.

The Center for Geographic Information is the agency that developed the Michigan Geographic Framework. This was a cooperative effort between state agencies and several metropolitan planning organizations to develop a single, statewide geographic information system (GIS) base map. This map contains the most up-to-date version of Act 51 certified roads and streets. The Council’s 2003 work program required using the Framework and all data collected is to be consistent with the requirements of the Framework. The selection of CGI was consistent with the provisions of Executive Order 2001-3 which established the Department of Information Technology.

2003 Work Program

The Council produced a work program for 2003 that was approved by the State Transportation Commission on February 27, 2003. The work program can be seen on the Council’s web site at http://www.michigan.gov/documents/MDOT_Asset_Mgmt_workprogram_2003_62891_7.pdf

Also, one can view an assessment of the individual work elements in the Council’s year end report at http://www.michigan.gov/documents/MDOT_Asset_Mgt_Year-End_Report_2003_82665_7.pdf

The Council is in the process of developing a work program for 2004-06. This document will be available on-line upon approval by the Council and the State Transportation Commission.

Public Information Program

During 2003, the Council established a public information program that consisted of several elements. The primary means of informing the public of the Council's activities can be found on their web site at

http://www.michigan.gov/mdot/0,1607,7-151-9623_10697_27106---,00.html

At this site are bios of the Council members, meeting dates and minutes, monthly and quarterly reports, the Council's Annual Report, and their goal statement, objectives, and priorities. In addition, stakeholder groups are provided quarterly reports and copies of any major reports finalized by the Council. Stakeholders include the directors of the agencies or organizations represented on the Council, Federal Highway Administration officials, Michigan Chapter of American Public Works Association, Michigan Trucking Association, asphalt and concrete associations, the Local Technical Assistance Program (LTAP), the House and Senate Fiscal agency staff, Michigan Road Builders Association, and members of the Asset Management Action Team (Transportation Summit).

During 2004 the Council will establish an on-going liaison with the Asset Management Action Team as well as national asset management groups such as AASHTO's Subcommittee on Asset Management and the Midwest Region University Transportation Center. In addition, the Council will be working on the development of a communication and educational outreach plan.

Survey of Road Agencies

In an asset management process it is crucial to have the ability to forecast future road condition and to do investment analyses based on various funding levels. In order to do this efficiently you need a pavement management system.

During the early part of 2003, the Council, in cooperation with the County Road Association of Michigan, the Michigan Municipal League, and the department conducted a survey of all 617 public road agencies in Michigan. A copy of the survey form is included in the Appendix. The survey was intended to determine how many agencies were using some form of pavement management system. Out of 617 agencies 224 responses (36%) were received. Of more critical importance, of the 123 agencies that own 92% of the total miles, 116 responded (94%).

Less than half of the total respondents indicated they are using a pavement management system. Of the largest 123 agencies only 74 or 60% indicated they were using a pavement management system. This is crucial information to the Council for part of their legislative mandate is to recommend an asset management process that would be utilized for the entire 120,000 miles of public roads. Currently 62% of the total route miles are being managed through the use of various pavement management systems. This issue will take on even greater importance with the recent passage of Public Act 9 of 2004 which allows for cities and villages to move more than 25% of their major street funds to their local street funds if they are using an asset management process.

Council Priorities

A major activity for the Council during 2003 was the adoption of six priorities. It is the intent of the Council to focus on activities related to these priorities over the next several years. The Council will periodically review and revise them as necessary.

- To provide the Legislature and the State Transportation Commission with an annual assessment of the public roads and bridges within the state.
- To recommend a "strategy" to the State Transportation Commission.
- To recommend an asset management process statewide and the tools and procedures needed to implement such a process.
- To serve as an educational forum regarding the benefits of using an asset management process and those elements that feed into such a process.
- To develop and maintain a spirit of cooperation amongst road agencies.
- To work with regional planning agencies and MPOs to carry out the activities necessary to fulfill these priorities.

During 2004, the Council will be developing and adopting a goal statement and objectives. These objectives will form the basis of the Council's work program during the next several years.

Expenses

MCL 247.659a(9) requires the Council to report on their expenditures for the past year. During 2003, the Council had total expenses of \$529,192.08 of which \$508,539 or 96% was for the data collection effort. This information is based upon the department's WEBFANCY financial tracking system and represents expenditures through December 31, 2003.

The Council anticipates increased expenditures for 2004 as it implements various activities of the Council's work program that were in the early stages of development during 2003. These include initiating various pilot projects to determine the cost and time needed to collect condition data on all 120,000 miles; testing of various models; and the development of mix of fixes and performance measures. In addition, the contracts with the regional planning and development agencies were only partially funded during 2003. It is estimated that these contracts will be nearly \$900,000 for 2004. These expenses are for activities required by MCL 247.659a.

BRINGING IT ALL TOGETHER

CASE STUDY: KENT COUNTY

Kent County Road Commission's Experience in Asset Management

The majority of public roads in Michigan are under the jurisdiction of local governments. If the benefits of asset management are to be realized statewide, then it is imperative that the tools and procedures of asset management be utilized by local road agencies. Consequently, it is the intent of the Council to highlight agencies that are utilizing the principle of asset management in order to encourage other agencies to employ such methods.

The Kent County Road Commission's (KCRC) experience in asset management began in 1995 with an annual process of surveying pavement conditions on the primary road system for a new pavement management system. That effort significantly expanded the organization's ability to assess needs on a systems level and to forecast the impact of various investment alternatives. As a result, KCRC stepped up its investments in system preservation and the affect of that decision is illustrated on the accompanying chart.

In the mid-1990s, the trend in the condition of KCRC's primary road system was headed in the wrong direction. The miles of roads needing reconstruction were increasing per year while the roads considered needing only routine maintenance were declining. Leading up to that period, KCRC had completed many miles of expansion projects in response to a rapidly growing local economy and population. Annual surveys of road conditions, however, revealed the need to re-emphasize system preservation.

Since 1995, KCRC has more than doubled annual investments in its overlay and seal coat program. With the information generated by the pavement management system, KCRC has the ability to forecast the affect of its investment decisions. The accompanying chart demonstrates that ability and shows improving conditions on the primary road system due to increased investment in system preservation. This trend continues through 2008 with projects included in KCRC's current Five Year Improvement Program.

The Kent County Road Commission, in cooperation with the Grand Valley Metro Council (GVMC) transportation-planning program, adopted Micropaver as the area's official pavement management system. This program evaluates road segments according to a pavement condition index (PCI) which is used by GVMC to determine project eligibility for the Transportation Improvement Program (TIP). Various improvement types are associated with three PCI ranges.

<u>Improvement Need</u>	<u>PCI Range</u>
Routine Maintenance	71 - 100
Preservation	46 - 70
Resurface/Reconstruction	0 - 45

KCRC uses Micropaver to initially identify improvement projects and to evaluate different investment options. The Road Commission's philosophy is to insure that adequate investments are being made to preserve the primary road system as major expansion, construction, and reconstruction projects are considered.

To do so, a six-step planning process is followed each year as part of the annual budget cycle.

1. Survey Conditions: One-third of the roads on the primary road system are surveyed annually and the database is updated to reflect completed improvement projects.

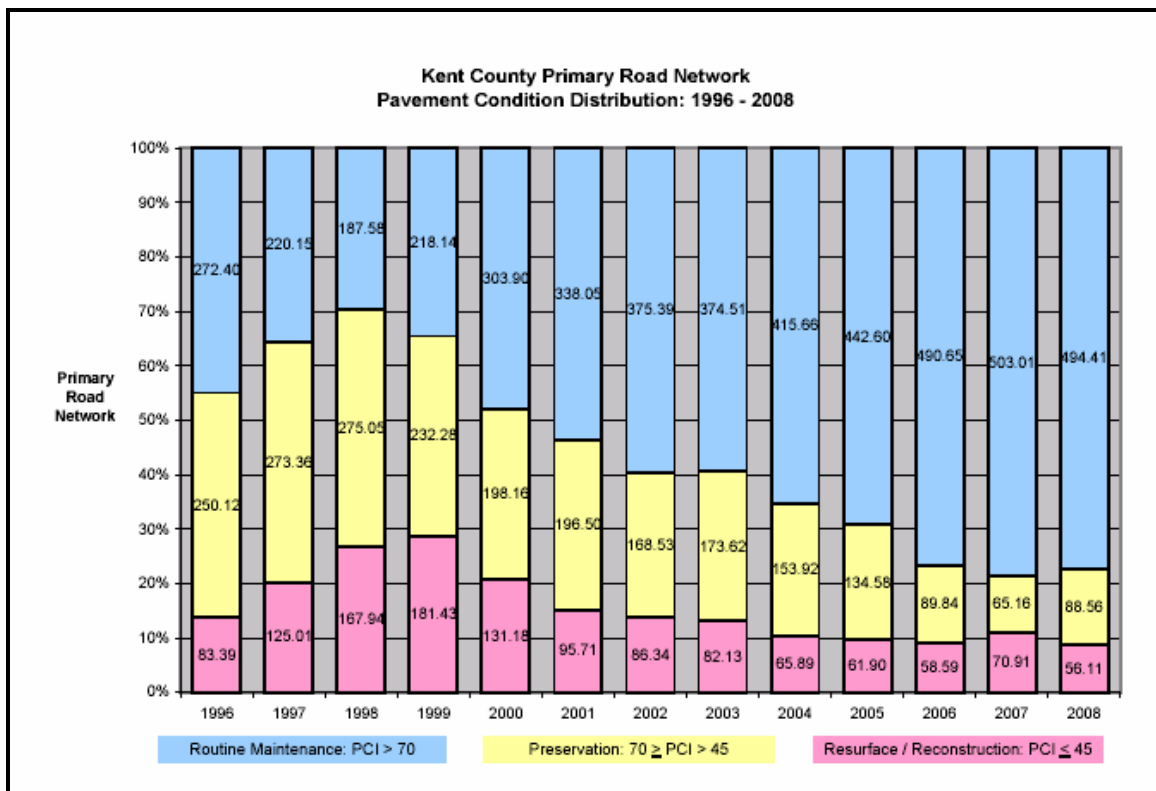
2. Determine Current Needs: A comprehensive list of primary road needs is produced annually using a variety of indicators including PCI, existing and projected traffic volume, and all-season condition.

3. Select and Package Projects: Staff from Planning, Engineering, and Maintenance review the needs list and cooperatively identify potential projects for the upcoming five-year period.

4. Analyze Future Conditions: Based upon the projects selected in Step 3, future conditions are forecast to determine if system performance objectives are being achieved.

5. Update Improvement Program: The Five-Year Improvement Program is updated as part of the process of developing the annual budget.

6. Monitor Performance : As projects are implemented, the condition of select segments are surveyed annually to more precisely determine the performance of various improvement strategies.



Asset management has become ingrained in the Kent County Road Commission's overall planning and annual budgeting processes. It is a fundamental process of systematically assessing the future of present decisions. With that in mind, it obviously

has application in many other functions in this, or any other organization. At this time, KCRC has completed condition surveys on the county's local road system is looking forward to other applications as well.

Any questions about Kent County Road Commission's experience in Asset Management may be directed to Steve Warren, KCRC Deputy Director, or Roger Belknap, Transportation Planner.

APPENDIX

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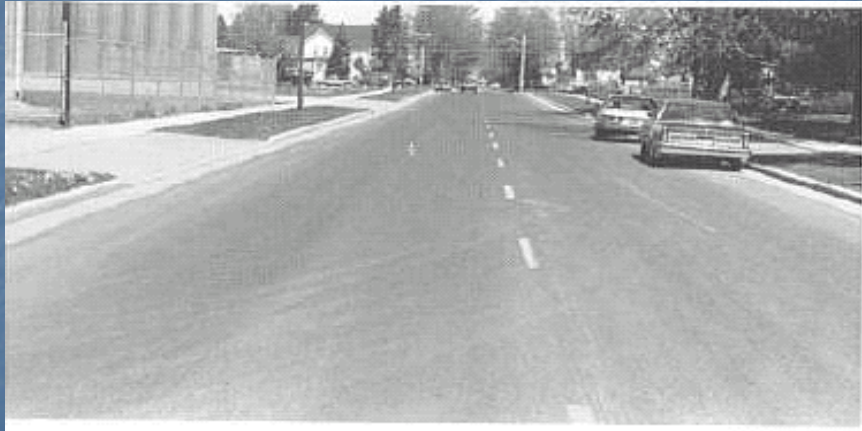
Telephone: 517-335-2606

Email: lillyr@michigan.gov

PASER PHOTOS

The following photos are taken from various manuals published by the Transportation Information Center, University of Wisconsin-Madison.

ASPHALT -- 10



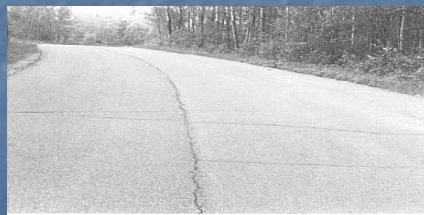
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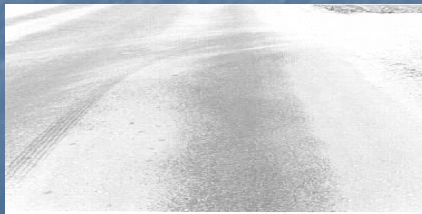
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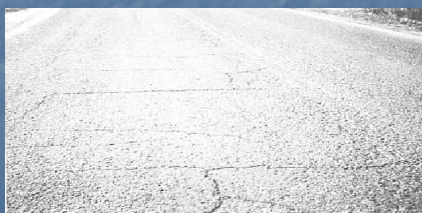
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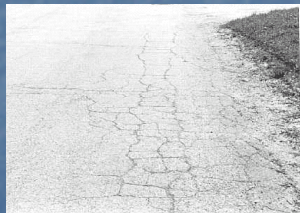
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ASPHALT -- 2



ASPHALT -- 1



CONCRETE -- 10



CONCRETE -- 9



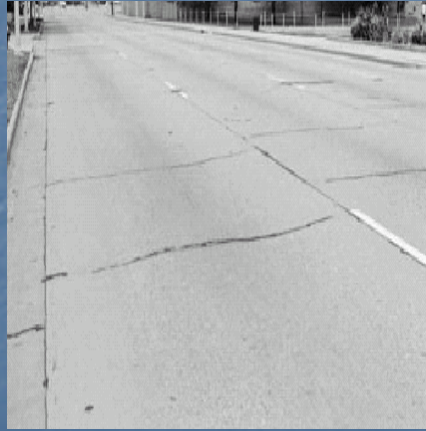
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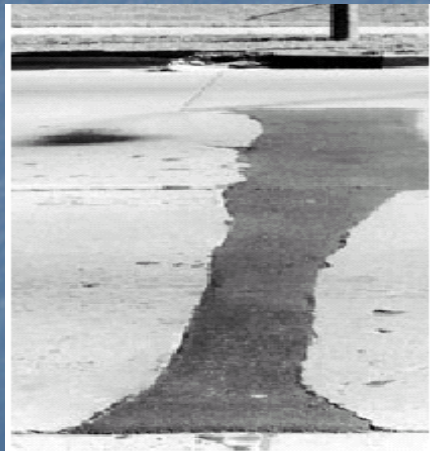
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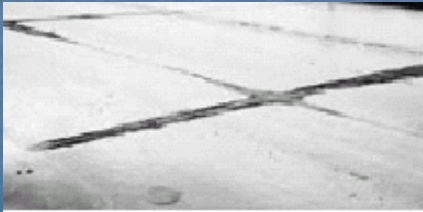
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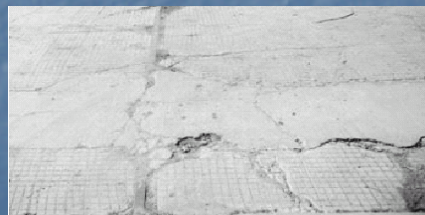
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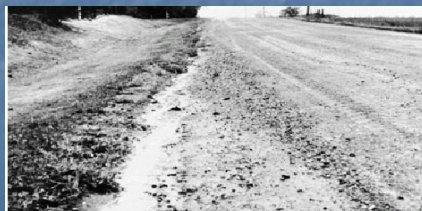
CONCRETE -- 1



GRAVEL -- 10



GRAVEL -- 8



GRAVEL -- 6



GRAVEL -- 4



GRAVEL -- 2



GRAVEL -- 1



DEFINITIONS

Alligator Cracking: Interconnected cracks in asphalt pavement forming small pieces ranging in size from one inch to approximately six inches. They tend to be irregular in shape. Alligator cracks are caused by repeated traffic loadings and are generally located in traffic areas such as the wheel paths.

Arterials: A designation of a roadway from the National Functional Classification. Arterials are divided into subcategories of ***principal*** and ***minor***. Principal arterials are at the top of the hierarchy. They generally carry long-distance, through travel movements. They also provide access to important traffic generators such as major airports or regional shopping centers. Examples of principal arterials include freeways, major U. S. routes, state trunk lines between large cities, and important streets in large cities.

Minor arterials are similar in function to principal arterials, except they carry trips of a shorter distance and to lesser traffic generators. Examples include state routes between smaller cities, surface streets of medium importance in large cities, and important surface streets in large and small cities.

Principal Arterials are designated in the Framework as NFC routes by the following numbers:

- 1 – Rural Interstate
- 2 – Rural Other Principal Arterial
- 5 – Rural Other Freeway
- 11 – Urban Interstate
- 12 – Urban Other Freeway
- 14 – Urban Other Principal Arterial

Minor arterials are designated in the Framework as NFC routes by the following numbers:

- 6 – Rural Minor Arterial
- 16 – Urban Minor Arterial

Asphalt Pavement: Pavement consisting of fine and coarse aggregates held together by bituminous cement. Also referred to as a flexible pavement.

Block Cracking: Block cracking divides the pavement surface into rectangular shaped pieces with cracks that intersect at about 90 degrees. This type of distress differs from alligator cracking in that alligator cracks form smaller, irregular shaped pieces with sharp angles. Block cracking is caused principally by shrinkage of the pavement and daily temperature cycling.

Bridge: A structure, including supports, built over a depression, watercourse, highway, railroad or other obstruction, with a clear span of more than 20 feet measured along the center of the roadway.

Bridge Rehabilitation: Activities that improve element integrity including overlays; superstructure or substructure repairs; and substructure replacement.

Bridge Replacement: Activities that replace elements including deck replacement, superstructure replacement; and complete bridge replacement.

Capital Preventive Maintenance: Capital preventive maintenance is a planned set of cost effective treatments to an existing roadway system and its appurtenances that preserves, retards future deterioration and maintains or improves the functional

condition of the system without (significantly) increasing structural capacity. The purpose of capital preventive maintenance fixes is to protect the pavement structure, slow the rate of pavement deterioration and/or correct pavement surface deficiencies. Surface treatments are targeted at pavement surface defects primarily caused by the environment and by pavement material deficiencies. Examples of CPM treatments include:

- Non-structural bituminous overlay (One inch or less)
- Surface milling and non-structural bituminous overlay
- Chip seals
- Micro-surfacing
- Overband crack filling
- Bituminous shoulder ribbons
- Full-depth concrete pavement repairs
- Joint resealing
- Joint and surface spall repair
- Diamond grinding
- Dowel bar retrofit
- Open-graded underdrain outlet clean out and repair
- Crack repair (clean and seal, saw and seal, rout and seal)
- Seal coating (fog seal, pavement rejuvenator, sand seal, slurry seal)
- Patching

“These fixes mitigate or delay deterioration while the pavement subgrade is in good condition. CPM is intended to address pavement problems before the structural integrity of the pavement has been impacted.” (“Status of Pavement Management Systems [PMS] in Southeast Michigan,” SEMCOG, May 2003, p. 18) Capital preventive maintenance is applied to pavements having a remaining service life of 3 years or more. This category applies to roads with PASER ratings of 5, 6, or 7.

Collectors: A designation of a roadway from the National Functional Classification. Collectors tend to provide more access to property than do arterials. Collectors also funnel traffic from residential or rural areas to arterials. Examples of collector roads include county, farm-to-market roads, and various connecting streets in large and small cities. Collectors are designated in the Framework as NFC routes by the following numbers:

- 7 – Rural Major Collector
- 8 – Rural Minor Collector
- 17 – Urban Collector

Composite Pavement: Pavement consisting of asphalt overlaying a concrete base.

Concrete Pavement: Pavement consisting of Portland cement, fine and coarse aggregates, and perhaps steel-reinforcing rods. Also referred to as a rigid pavement.

Crack Sealing: Process where cracks in a pavement are filled in with material to prevent the infiltration of water.

Culvert: A structure, including supports, built over a depression, watercourse, highway, railroad or other obstruction, with a clear span of less than 20 feet measured along the center of roadway.

Deflection: A load induced, downward movement of a pavement section.

Design Service Life: Expected lifespan of a road based on pavement type, base and subbase, thickness, drainage, and traffic.

Deterioration: The breaking up of pavement due to traffic or weathering.

Distortion: Movement of a pavement away from its initial position.

Federal-Aid Eligible: Any public road or bridge that is eligible for federal aid to be spent for the construction, repair, or maintenance of that road or bridge. These roads and bridges are identified using the national functional classification and exclude local roads such as neighborhood streets.

Fracture: Fatigue cracking and thermal cracking distresses suffered by pavement.

Friction: The ability of a pavement surface to resist skidding.

Grade Separation: A structure that provides for highway traffic, pedestrian traffic, or utilities to pass over or under another highway or the tracks of a railway.

Highway: A general term denoting a public way for purposes of vehicular travel, including the entire area within the right of way.

Joint Efficiency: The ability of a concrete pavement to transfer loads from one slab to the next.

Maintenance/Bridges: Activities that sustain a bridge condition and restore element integrity. Typical work activities include clean/repair drainage systems; spot painting; joint gland repair/re place; concrete patching, sealing, crack sealing; joint replacement; pins & hanger replacement; painting; and thin overlays.

Median: The portion of a divided highway separating the traveled ways.

Overlay: Process where a new course of asphalt or concrete is put on top of the existing pavement.

PASER (Pavement Surface Evaluation and Rating): A visual method used to rate pavement condition. Often referred to as a “windshield” survey.

Pavement Structure: All combinations of subbase, base course, and surface course, including shoulders, placed on a subgrade.

Project: A specific section of the highway or property on which the construction operation is to be performed as described in the contract.

Project Limits: The physical limits given in the contract showing the points of beginning and ending of the work included in the project.

Raveling: Progressive loss of pavement material from the surface downward.

Reactive Maintenance: Reactive maintenance is an activity that must be done in response to events beyond the control of the agency. Reactive maintenance cannot be scheduled because events occur without warning and often must be immediately addressed. Examples of reactive maintenance activities include:

- Snow plowing
- Pothole patching
- Removing and patching pavement blowups

Remaining Service Life: Estimated time, in years, before a pavement will fail.

Right-of-Way: A general term denoting land, property or interest therein acquired for or devoted to a highway, as shown on the plans.

Roadbed: The portion of the roadway between the outside edges of finished shoulders, or the outside edges of berm immediately back of curbs or gutters, when constructed.

Roadside: The portion of the right-of-way outside of the roadway.

Roadway: The portion of the right-of-way required for construction, limited by the outside edges of slopes and including ditches, channels, and all structures pertaining to the work.

Roughness: Irregularities in the pavement surface that adversely affects ride quality, safety, and vehicle maintenance costs.

Routine Maintenance: Routine maintenance is the day-to-day maintenance activities that are scheduled. Examples of routine maintenance activities include: street sweeping, drainage clearing, shoulder gravel grading, and sealing cracks to prevent standing water and water penetration. This category applies to roads with PASER ratings of 8, 9, or 10.

Rutting: Displacement of material, creating channels in the pavement along the wheel paths.

Sealcoat: A Sealcoat surfaced road is a gravel road that has been treated with an asphalt sealcoat in order to maintain the ride, weather-proof the surface, and eliminate dust problems. The service life is generally about 5 years.

Shoulder: The portion of the roadway adjacent to the traveled way for accommodation of stopped vehicles, for emergency use, and for lateral support of base and surface courses.

Sidewalk: That portion of the roadway primarily constructed for pedestrian use.

Structural Improvements: This category includes work typical identified as rehabilitation and reconstruction which address the structural integrity of a road. This category applies to PASER ratings of 1, 2, 3, and 4.

Rehabilitation: Any fix that has an estimated design or fix life of ten to twenty years. Rehabilitation fixes include:

- Two or three course bituminous overlays
- Concrete patching and diamond grinding
- Crush and shape with bituminous overlay
- Rubblize and multiple course bituminous overlay
- Unbonded concrete overlays
- Longitudinal and transverse joint repairs

Reconstruction: Any fix that typically removes and replaces the entire pavement structure. Reconstruction fixes have a design life of twenty years or more.

Subbase: The layer of specified material placed on the subgrade as a part of the pavement structure.

Subgrade: The portion of the earth grade upon which the pavement structure is placed.

Substructure: All of the structure below the bearings of simple and continuous spans, the skewbacks of arches, and the tops of footings of rigid frames, including backwalls, wing walls, and wing protection railings; except backwalls designed integrally with the superstructure.

Superstructure: All of a structure not classified as substructure.

Surface Course: The top layer of a pavement structure.

Total Dollars Awarded: The cost of a project as indicated in the agency's formal execution of the contract.

Traffic Control Devices: Signs, signals, lighting devices, barricades, delineators, pavement markings, traffic regulators and all other equipment for protecting and regulating traffic in accordance with the MMUTCD, unless otherwise specified in the contract.

Traffic Lane: The portion of the traveled way used for the movement of a single line of vehicles.

Traveled Way: The portion of the roadway designated for the movement of vehicles, exclusive of shoulders and auxiliary lanes.

Treatment: A mitigating measure used to repair a pavement.

Utility: Properties of railway, telegraph, telephone, water, sewer, electric, gas, petroleum, cable television and similar companies.

Work: The furnishing of all labor, materials, equipment, and other items necessary to complete the project according to the contract.

Work Order: A written order by the engineer requiring performance by the contractor.

These definitions have been culled from the following sources:

"Alternate Bid Study M-6 South Beltline," Michigan Department of Transportation, October 4, 2000

"2003 Standard Specifications for Construction," Michigan Department of Transportation, February 2003

"Status of Pavement Management Systems (PMS) in Southeast Michigan," SEMCOG, May 2003

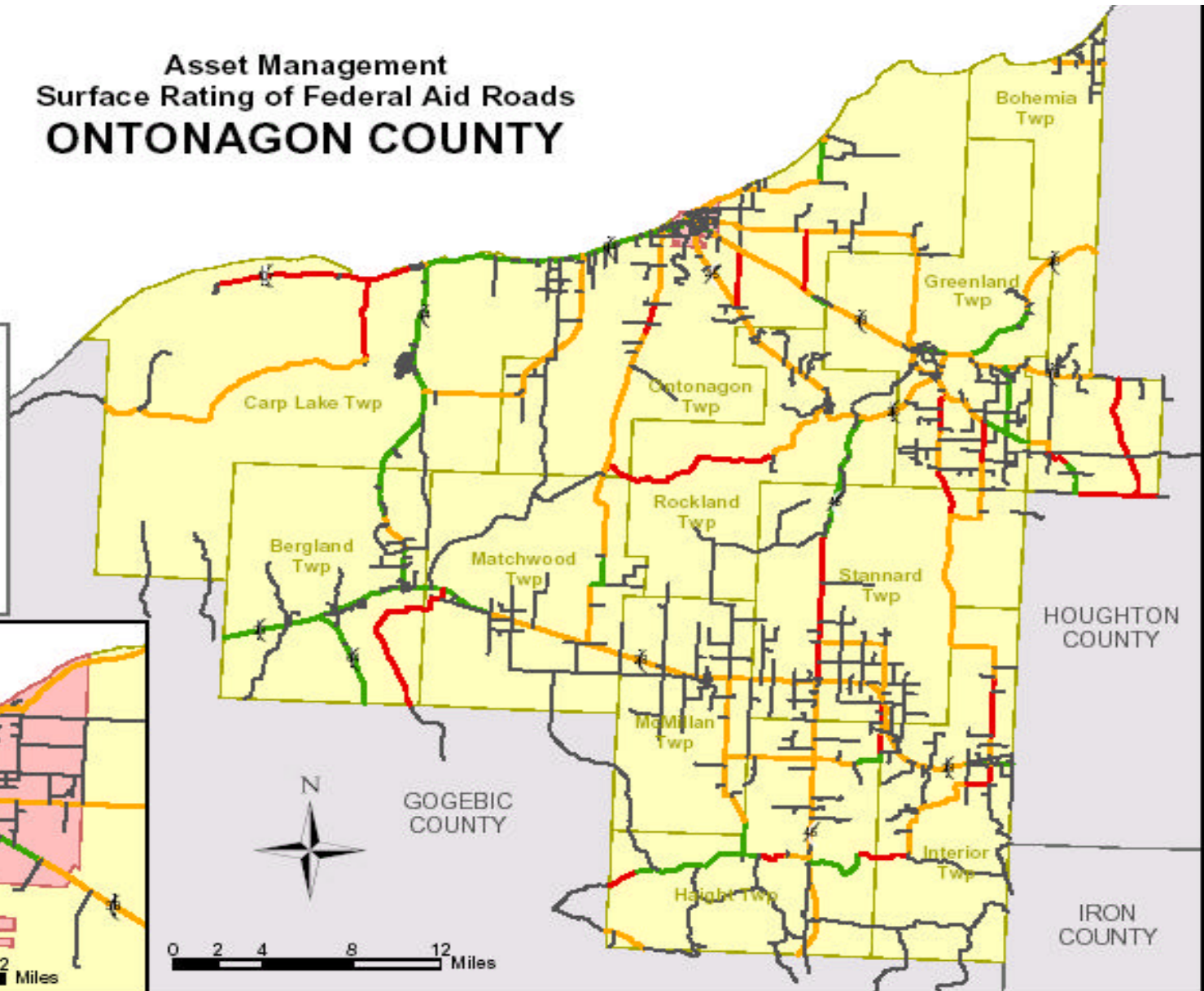
PASER Manuals, Transportation Information Center, University of Wisconsin-Madison

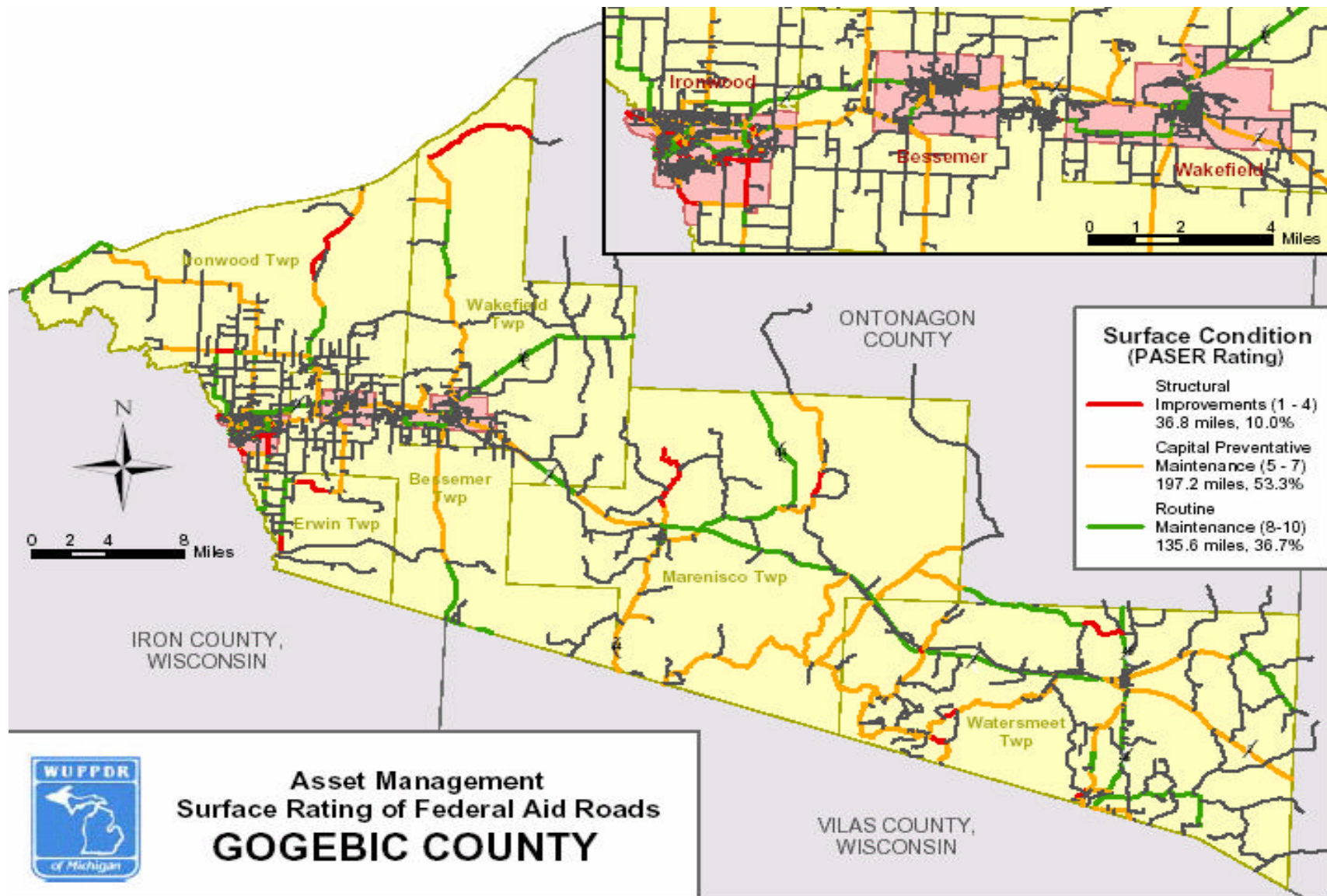


Asset Management Surface Rating of Federal Aid Roads ONTONAGON COUNTY

Surface Condition (PASER Rating)

- Structural Improvements (1 - 4)
75.5 miles, 20.3%
- Capital Preventative Maintenance (5 - 7)
210.7 miles, 56.5%
- Routine Maintenance (8-10)
85.5 miles, 22.9%





**TRANSPORTATION ASSET MANAGEMENT COUNCIL
SURVEY**

1. Do you collect road condition data? YES ☐ NO ☐
2. Do you use software to analyze the data? YES ☐ NO ☐
3. If you are not collecting this data, would you be interested in having such data available to you? YES ☐ NO ☐
4. How often do you collect condition data?
ANNUALLY ☐
EVERY OTHER YEAR ☐
EVERY THIRD YEAR ☐
5. What method of assessment do you use?
PASER ☐
MICRO-PAVER ☐
INTERNATIONAL
ROUGHNESS INDEX ☐
OTHER ☐ PLEASE IDENTIFY:
6. Is the rating method based on a rating of:
1-10 ☐
1-100 ☐
OTHER ☐ PLEASE SPECIFY:
7. What software do you use to analyze the data?
8. How do you use the data and/or software?
9. How often do you use it?
THIS MONTH ☐
WITHIN LAST 6 MONTHS ☐
WITHIN LAST YEAR ☐
HAVE NOT USED YET ☐
10. Do you collect this data in-house or contract for it?
IN-HOUSE ☐ CONTRACT ☐
IF A CONTRACT, WITH WHOM?:

11. What data are you collecting?

ROAD CONDITION ☐
PAVEMENT TYPE ☐
DRAINAGE ☐
SHOULDERS ☐
CULVERT CONDITION ☐
NUMBER OF LANES ☐
TRAFFIC VOLUMES ☐
COMMERCIAL TRAFFIC ☐
BASE CONDITION ☐
OTHER ☐

What data would you like to collect?

ROAD CONDITION ☐
PAVEMENT TYPE ☐
DRAINAGE ☐
SHOULDERS ☐
CULVERT CONDITION ☐
NUMBER OF LANES ☐
TRAFFIC VOLUMES ☐
COMMERCIAL TRAFFIC ☐
BASE CONDITION ☐
OTHER ☐

12. How large is your system?

UNDER 25 MILES ☐
BETWEEN 25 AND 50 MILES ☐
BETWEEN 50 AND 100 MILES ☐
OVER 100 MILES ☐

Agency Name:

Phone:

Contact Person:

If you have any questions regarding this survey please contact:

Rick Lilly, Staff Coordinator
Transportation Asset Management Council
517-335-2606

PLEASE RETURN THIS SURVEY TO:

NATIONAL FUNCTIONAL CLASSIFICATION

	ROUTINE MAINTENANCE		PREVENTIVE MAINTENANCE		STRUCTURAL IMPROVEMENT		TOTAL	
	Lane Miles	Percent	Lane Miles	Percent	Lane Miles	Percent	Lane Miles	Percent
Freeway	4,507.24	4.80%	4,630.00	4.93%	681.38	0.73%	9,818.62	10.46%
Urban	1,970.19	2.10%	2,299.58	2.45%	294.94	0.31%	4,564.71	4.89%
Rural	2,537.05	2.70%	2,330.42	2.48%	386.44	0.41%	5,253.91	5.59%
Non-Freeway	12,064.85	12.85%	17,773.06	18.93%	2,260.76	2.41%	32,098.67	34.18%
Urban	5,700.28	6.07%	10,692.57	11.39%	1,623.97	1.73%	18,016.62	19.19%
Rural	6,364.57	6.78%	7,080.49	7.54%	636.79	0.68%	14,081.85	15.00%
ARTERIALS	16,572.09	17.65%	22,403.06	23.85%	2,942.14	1.13%	41,917.29	44.64%
Urban	1,674.46	1.78%	3,624.96	3.86%	756.39	0.81%	6,055.81	6.45%
Rural	15,923.28	16.96%	23,625.54	25.16%	6,386.58	6.80%	45,935.40	48.92%
COLLECTORS	17,597.74	18.74%	27,250.50	29.02%	7,142.97	7.61%	51,991.21	55.36%
TOTAL	34,169.83	36.39%	49,653.56	52.87%	10,085.11	10.74%	93,908.50	100.00%

Source: 2003 TAMC Data Collection Process

As of December 2003

SURFACE TYPE

	ROUTINE MAINTENANCE		PREVENTIVE MAINTENANCE		STRUCTURAL IMPROVEMENT		TOTAL	
	Lane Miles	Percent	Lane Miles	Percent	Lane Miles	Percent	Lane Miles	Percent
ASPHALT	29,263.09	31.16%	42,549.24	45.31%	7,174.74	7.64%	78,987.07	84.11%
CONCRETE	3,354.41	3.57%	5,267.14	5.61%	1,115.41	1.19%	9,736.96	10.37%
UNPAVED	1,552.33	1.65%	1,837.18	1.96%	1,794.95	1.91%	5,184.46	5.52%
TOTAL	34,169.83	36.39%	49,653.56	52.87%	10,085.10	10.74%	93,908.49	100.00%

Source: 2003 TAMC Data Collection Process
As of December 2003

BRIDGES

ARTERIALS	RURAL	URBAN	TOTAL
STRUCTURALLY DEFICIENT	188	492	680
Percent	3%	7%	9%
FUNCTIONALLY OBSOLETE	74	529	603
Percent	1%	7%	8%
GOOD CONDITION	1321	1545	2866
Percent	18%	21%	40%
COLLECTORS	RURAL	URBAN	TOTAL
STRUCTURALLY DEFICIENT	342	79	421
Percent	5%	1%	6%
FUNCTIONALLY OBSOLETE	244	123	367
Percent	3%	2%	5%
GOOD CONDITION	2007	285	2292
Percent	28%	4%	32%
TOTALS	4176	3053	7229

Source: National Bridge Inventory File, MDOT, February 2004